

CLAIMS

What is claimed is:

1 1. An optical router in an optical communication system for routing
2 multiplexed signals having a plurality of wavelengths that create a spectrum through the
3 communication system by spatially shifting the wavelengths, said optical router including an
4 output element comprising:

5 a linear element for receiving the signals having the plurality of wavelengths and
6 for dispersing the spectrum into discrete regions onto an intermediate image plane;

7 a discontinuous optical element in optical communication with the intermediate
8 image plane for laterally shifting the discrete regions by predetermined lengths to produce a
9 laterally shifted spectrum, each of said predetermined lengths being associated with one of the
10 discrete regions; and

11 a re-imaging optical element for receiving the laterally shifted spectrum and for
12 removing the dispersion created by said linear element and for re-imaging the spectrum onto the
13 output element.

1 2. The optical router of claim 1, wherein said linear element comprises a
2 micro-optic array.

1 3. The optical router of claim 2, wherein said micro-optic array comprises a
2 plurality of input fibers each is adapted to transmit one of the plurality of wavelengths.

1 4. The optical router of claim 1, wherein said linear element comprises a

2 micro-electromechanical structure tilt mirror that is electromechanically actuatable.

1 5. The optical router of claim 1, wherein said discontinuous optical element
2 comprises a grating.

1 6. The optical router of claim 5, wherein said grating comprises a silicon
2 wafer and a plurality of v-shaped grooves defined in the silicon wafer.

1 7. The optical router of claim 1, wherein said discontinuous optical element
2 comprises a micro-electromechanical structure (MEMS) tilt mirror plate.

1 8. The optical router of claim 1, wherein said re-imaging optical element
2 comprises a lens for receiving the spatially shifted spectrum and a grating for removing the
3 dispersion and focusing the received spatially diffused spectrum onto the output element of the
4 router.

1 9. The optical router of claim 1, wherein said re-imaging element comprises
2 a concave mirror.

1 10. A method for routing optical signals having a plurality of wavelengths that
2 create a spectrum through an optical communication system by spatially shifting the
3 wavelengths, comprising the steps of:

4 linearly imaging the spectrum into discrete regions and onto an intermediate
5 image plane, wherein the imaging step introduces linear dispersion into the spectrum;

6 laterally shifting the discrete regions by predetermined lengths to produce a

7 laterally shifted spectrum, each of said predetermined lengths being associated with one of the
8 discrete regions; and

9 re-imaging the laterally shifted spectrum to remove the linear dispersion
10 introduced by said imaging step and for outputting the latterly shifted spectrum onto an output
11 element in the optical communication system.

1 11. The method of claim 10, wherein said shifting step comprises diffracting
2 the spectrum to introduce lateral space shifts to the discrete regions.

1 12. The method of claim 11, wherein said shifting step further comprises
2 reflecting the laterally spaced shifted spectrum with an array of reflecting mirrors before re-
3 imaging the spectrum.

1 13. The method of claim 10, wherein said re-imaging step further comprises
2 reflecting the shifted, linearly dispersed spectrum through an element for removing the linear
3 dispersion.